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M.T. 6/20/06

June 19, 2006

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Examiner Tsidulka
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Re: Serial No. 10/676,762; Filed: 10/01/2003
Our File No.: LEM 0120 PUSA

Dear Examiner Tsidulka:

Attached hereto is copy of the English translation of the specification as filed for the above-identified application. If there are any further documents which you need, please call me.

Very truly yours,

BROOKS KUSHMAN P.C.

Ralph M. Burton

RMB/jr
Enclosure

SLI Lichtsysteme GmbH

Reflector Lamp

The invention relates to a reflector lamp, particularly to a metal halide reflector lamp comprising
an outer envelope formed as a reflector with a neck portion and a base,
a light transmitting cover, particularly a lens which along its circumference is connected to an outer edge of the reflector, whereby reflector, base and cover are shaped generally rotationally symmetrical around a longitudinal axis,
and a light capsule or an arc tube, resp., having pinch seals at its ends and being surrounded by a shield formed as a tubular envelope and being arranged in the reflector between base and cover, which capsule is retained within the shield by means of a first and a second lead-in,
the first lead-in at the first end of the capsule at the side of the base, and the second lead-in, being installed on the outside of the shield and introduced into its end at the side of the cover, at the second end of the capsule at the side of the cover, being sealed each in the respective pinch seal.

A reflector lamp of this kind is known (EP 0 902 458 A2) in which a melting-in of the tubular envelope of the shield is provided in the base area such that the two lead-ins emerging from the base area are sealed into this pinch seal-like melting-in from which they exit then in order to enter into pinch seals again, at this time into the pinch seals of the capsule. The shield

thereby provides a so-called burst protection which protects the environment as against shards of a capsule which could explode possibly sometimes.

This known shield closed all around can be filled with a protective gas like nitrogen in order to protect from oxidation, at temperatures above 400 degrees Celsius, the welding between the respective lead-in and the respective sealed-in foil made from molybdenum which is necessary when quartz is used for the capsule. It is known that sealings of lead-ins within quartz glass are not gas-tight because the thermal expansion coefficients are too different. The known shield as such, however, does not need any foils melted in because aluminum silicate glass is used for the shield, the thermal expansion coefficient of which corresponds essentially to that of the material of the lead-ins.

Even if this known structure is relatively compact already, the presence of a melt-in of the lead-ins into the pinch seal-like end of the shield on the side of the base and the use of protective gas constitutes a remarkable manufactural-technical expenditure on the one side, on the other side such melt-in makes the shield longer and by this enlarges the reflector lamp in the direction of its longitudinal axis.

With the reflector lamp known from WO 96/27205 A1 the first as well as the second lead-in are installed within the shield and exit from the shield at the side of the base, whereby a sealing consisting of curable cement is present between the shield and the lead-ins which is to be regarded as an additional expenditure the same way as

a melt-in which is for granting a hermetic sealing of the shield.

Finally the EP 0 560 936 B1 teaches a reflector lamp with a cylindrical shield which is retained by special clips which at least partially grip around the circumference of the shield at its two ends. The clips form part of a separate maintenance structure for the shield which comprises a holding web between the two clips and a special holding ring for the holding web in the base aera of the lamp. This complicated maintenance structure for the shield forms a special expenditure.

In view of this the object underlying the invention is seen in the provision of a reflector lamp of this kind which can be manufactured with remarkably lesser expenditure and which, beyond that, is structured more compact, i. e. is shorter in the direction of its longitudinal or rotational, resp., axis.

This object is solved in accordance with the invention in that, renouncing melt-ins of the lead-ins within the shield which seal the capsule as against the environment, the lead-ins are fixed in the base only, and in that the second lead-in is biased such that, by this second lead-in which abuts from the outside against the end of the shield on the side of the cover, the shield is pressed against a bottom of the neck portion of the reflector, the lead-ins being guided through openings in this bottom towards the base, which is secured to the bottom, and are fixed there.

To dispose of melt-ins or sealings, resp., of the lead-ins in the shield which seal the capsule as against the environment, whereby the lead-ins are fixed in the base of the reflector lamp only, makes the reflector lamp in accordance with the invention shorter between base and cover or lens, resp., and by this renders same more compact; in addition thereto it provides savings in manufacture expenditure. The fixation of the shield at the reflector being necessary anyway is accomplished by the inventive development of the second lead-in in that the second lead-in draws the shield to the bottom of the reflector and keeps it fixed to the bottom, the ring shaped abutment surface of the end of the shield present at the side of the base providing stability.

It is understood that this ring shaped abutment surface means no hermetic seal and that, therefore, the ambient air and by this oxygen have access to the interior of the shield and, hence, to the light capsule or arc tube, resp., and temperatures above 400 degrees Celsius may lead to oxidation of the welding between lead-in and sealed-in foil. This has negative effects and should be avoided, therefore. But in further development of the invention the temperature should be kept low in this area or the access of air and by this oxygen to this area should be prevented.

To avoid this several possibilities are offered according to the invention:

1.
A first heat protection which surrounds the end of the arc tube in the region of its pinch seal on the side of

the base above the welded joint of lead-in and melted-in foil and which lies opposite the bottom of the reflector neck is provided with an opening for the passage of the second lead-in, this opening being aligned with the first passage opening in the bottom.

The heat protection prevents the temperature in the region of the welding between lead-in and melted-in foil from becoming so high that oxidation occurs.

Suitably the first heat protection on the side of the base is fixed by support in the neck region and on the side of the cover is fixed by the shield being drawn to such support by the second lead-in. Further, the second lead-in and the first heat protection are insulated from each other in the region of the opening.

Advantageously a second heat protection can also be provided which surrounds the end of the capsule on the side of the cover in the region of its pinch seal below the welding between second lead-in and melted-in foil and lies opposite the upper end of the shield on the inner side in order to achieve the same effects with regard to the end of the capsule on the side of the cover.

2.

Between the end of the arc tube on the side of the base and the shield on the one hand as well as between the shield and the neck of the reflector on the other hand cement can be inserted such that the lower region of the pinch seal end is covered by cement. By this a cooling effect is achieved which prevents the oxidation

mentioned under 1. and in addition thereto the whole structure becomes more stabile thereby.

3.
The location at which the first lead-in enters the appertaining pinch seal of the first end of the capsule can be closed by glass solder. Advantageously also the location at which the second lead-in enters the appertaining pinch seal of the second end of the capsule can be closed with glass solder. Instead of glass solder sodium silicate glass can be used as well. By this any access of air and, therefore, oxygen is reliably prevented and an oxidation of the welding between lead-in and melted-in foil blocked.

Two further advantageous possibilities consist in either to platinize the lead-ins or to cover same with quartz glass, which in both cases prevents its oxidation.

The invention and its advantageous developments are explained in more detail by the assistance of embodiments depicted in the drawings.

Fig. 1 is a cross section through a first embodiment of the invention;

Fig. 2 is a cross section through a second embodiment;

Fig. 3 is a cross section through a third embodiment;

Fig. 4 is a cross section through a fourth embodiment;

Fig. 5 is a cross section through a fifth embodiment:

Fig. 1 illustrates a first embodiment of a reflector lamp 1, particularly a metal halogen vapor reflector lamp, having an outer envelope formed as a reflector 2 with a neck region 3 having a base 4 and as a light transmitting cover 5, particularly a lens which along its circumference 6 is connected to an outer edge 7 of the reflector 2.

Reflector 2, base 4 and cover 5 are formed essentially rotationally symmetrical around a longitudinal axis 8.

Between base 4 and cover 5 an arc tube 9 having pinch seals 10 and 11 at its ends is arranged in the reflector 2 and is surrounded by a shield 14 in the shape of a tubular envelope. The shield can serve not only as a burst protection but can also consist of UV absorbent glass or can be coated with a UV absorbent layer in order to avoid an undesirable sodium loss. The arc tube 9 is held within the shield 14 by a first and by a second lead-in 12 and 13, the first lead-in 12 being sealed-in at the first arc tube end 15 at the side of the base and the second lead-in 13 being sealed-in at the second arc tube end 16 at the side of the cover, each within pinch seals 10, 11. The arrangement of the arc tube 9 is done preferredly concentrically along the rotational or longitudinal, resp., axis 8.

The second lead-in 13 is installed on the outside of the shield 14 and is inserted in the end 17 of same at the side of the cover 5.

In accordance with the invention, renouncing melt-ins of the lead-ins 12, 13 within the shield 14 which seal the

arc tube 9 against the environment, the lead-ins 12, 13 are fixed in the base 4 only. Further, the second lead-in 13 is biased such that, by this second lead-in 13 which abuts from the outside at 17' against the end of the shield 14 on the side of the cover 5, the shield 14 is pressed against a bottom 18 of the neck portion 3 of the reflector 2, the lead-ins 12, 13 being guided through openings 19, 20 in this bottom 18 towards the base 4, which is secured to the bottom 18, and are secured there or mechanically fixed, resp.. The ends of the lead-ins 12 and 13 are electrically connected with terminals 21 and 22 fixed within base 4.

In the further embodiments according to Fig. 2 to 5 similar parts are designated by the same reference numerals.

The second embodiment of the reflector lamp 1a illustrated in Fig. 2 corresponds essentially to the first embodiment according to Fig. 1 with the exception of the fact that the shield 14 is open at the side of the cover 5 the same way as at the side of the base, in other words, the shield is a cylinder open at both ends. Thereby the second lead-in 13 lies in the region 17' at the upper edge of the shield 14 and presses same against bottom 18.

With the third embodiment of the reflector lamp 1b illustrated in Fig. 3 a first heat protection 23 with a passage 24 for the second lead-in 13 is provided which surrounds the end 10 of the arc tube 9 at the side of the base in the region of its pinch seal above the welding between lead-in 12 and melted-in foil 12' and

lies opposite bottom 18. This passage 24 is aligned with the respective passage 20 in bottom 18.

As to be taken from Fig. 3, this first heat protection 23 at the side of the base 4 is fixed by support 23' in the neck region 3 and at the side of the cover 5 by the shield 14 drawn to the bottom by the second lead-in 13.

Suitably the second lead-in 13 and the first heat protection 23 are insulated from each other in the area of the passage 24.

The heat protection 23 protects the area of the pinch seal in which the welding between lead-in and melted-in foil 12' is to be found, as against the heat which is emitted from the arc tube 9.

Besides, in Fig. 3 a suitable extension on both sides 26 of the pinch seal end 10 is shown which effects a positioning of the arc tube 9 at the heat protection 23.

Suitably a second heat protection (not shown) can be provided which surrounds the end 16 of the arc tube 9 at the side of the cover 5 in the region of its pinch seal 11 below the welding between lead-in and melted-in foil and lies opposite to the upper end 17 of shield 14 interiorly.

With the fourth embodiment of the reflector lamp 1c illustrated in Fig. 4, between the first end 15 of the arc tube 9 at the side of the base and the shield 14 on the one hand as well as also between the shield 14 and the reflector neck 3 on the other hand, cement 28 is

inserted such that firstly a cooling effect is achieved which prevents an oxidation of the welding between lead-in 12 and melted-in foil, and secondly the whole structure becomes even more stabile.

With the fifth embodiment of the reflector lamp 1d illustrated in Fig. 5 the location 25 at which the first lead-in 12 enters into the appertaining pinch seal 10 of the first end 15 of the arc tube 9 is closed by glass solder 29.

Suitably also the location 27 at which the second lead-in 13 enters into the appertaining pinch seal 11 of the second end 16 of the arc tube 9 is closed by glass solder 29'. Instead of glass solder 29 and 29' sodium silicate glass can be used as well.

In a manner not shown the lead-ins 12, 13 can optionally be platinized or covered with quartz glass, which is not demonstrated in detail. Also in a manner not shown the lead-in 13 can be electrically insulated in the region of the pinch seals 10 and 11, e. g. by a ceramic sleeve.